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## GROUP 23

# AUTOMATIC TRANSMISSION

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## GENERAL INFORMATION

M2230000100537

The automatic transmissions have three types; F4A4B and W4A4B for 4G69 engine vehicles, W4A42 for 4G64 engine vehicles. Each transmission has the following features.

- The W4A4 transmission is based on the F4A4 transmission, however, the transfer case is added in order to be installed to 4WD vehicles.

- Although W4A4B transmission is basically the same as W4A42 type, the gear ratio at 2nd, 4th and reverse, and electronic control system have been changed.

*NOTE: Refer to 1996 COLT/LANCER Technical Information Manual (Pub. No. PYME9502) for more information regarding the description of structure and operations.*

## SPECIFICATIONS

## &lt;4G69&gt;

Item		Specifications	
Transmission model		F4A4B	W4A4B
Torque converter	Type	3-element, 1-stage, 2-phase type	
	Lock-up	Provided	
	Stall torque ratio	2.0	
Transmission type		4 forward speeds, 1 reverse speed, fully automatic	
Transmission gear ratio	1st	2.842	
	2nd	1.573	
	3rd	1.000	
	4th	0.688	
	Reverse	2.214	
Clutch		Multi-disc type (3 sets)	
Brake		Multi-disc type (2 sets)	
Manual control system		P-R-N-D (4 positions) + sport mode	
Shift pattern control		Electronic control (INVECS-II)	
Hydraulic control during shifting		Electronic control (Each clutch hydraulically independently controlled)	
Lock-up clutch control		Electronic control	
Transmission fluid	Specified lubricants	DIA QUEEN ATF SP III	
	Quantity L	7.7	8.1
Transfer oil	Specified lubricants	–	Hypoid gear oil API classification GL-5 SAE 90
	Quantity L	–	0.55

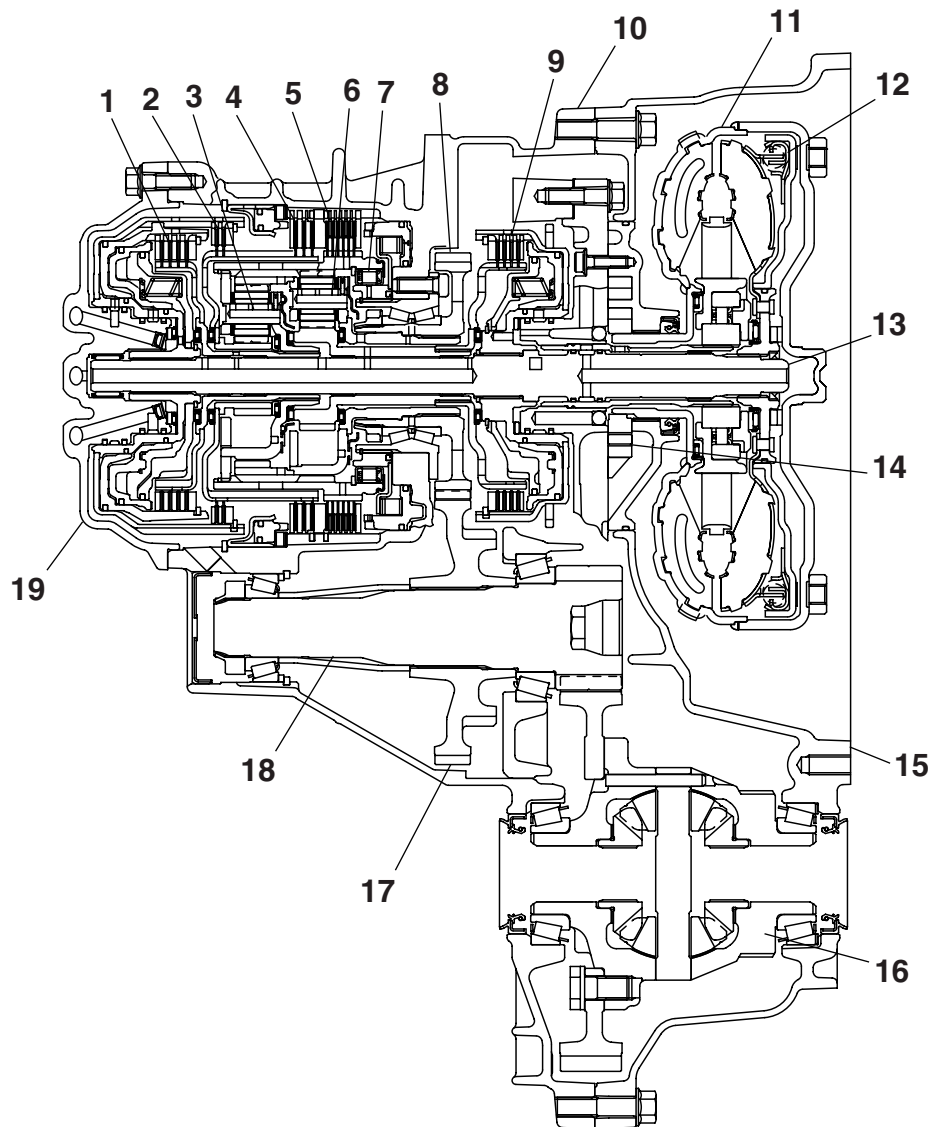
## &lt;4G64&gt;

Item		Specifications	
Transmission model		W4A42	
Torque converter	Type	3-element, 1-stage, 2-phase type	
	Lock-up	Provided	
	Stall torque ratio	2.01	
Transmission type		4 forward speeds, 1 reverse speed, fully automatic	

Item		Specifications
Transmission gear ratio	1st	2.842
	2nd	1.529
	3rd	1.000
	4th	0.712
	Reverse	2.480
Clutch		Multi-disc type (3 sets)
Brake		Multi-disc type (2 sets)
Manual control system		P-R-N-D (4 positions) + sport mode
Shift pattern control		Electronic control (INVECS-II)
Hydraulic control during shifting		Electronic control (Each clutch hydraulically independently controlled)
Lock-up clutch control		Electronic control
Transmission fluid	Specified lubricants	DIA QUEEN ATF SP III
	Quantity L	8.1
Transfer oil	Specified lubricants	Hypoid gear oil API classification GL-5 SAE 90
	Quantity L	0.55

## SECTIONAL VIEW

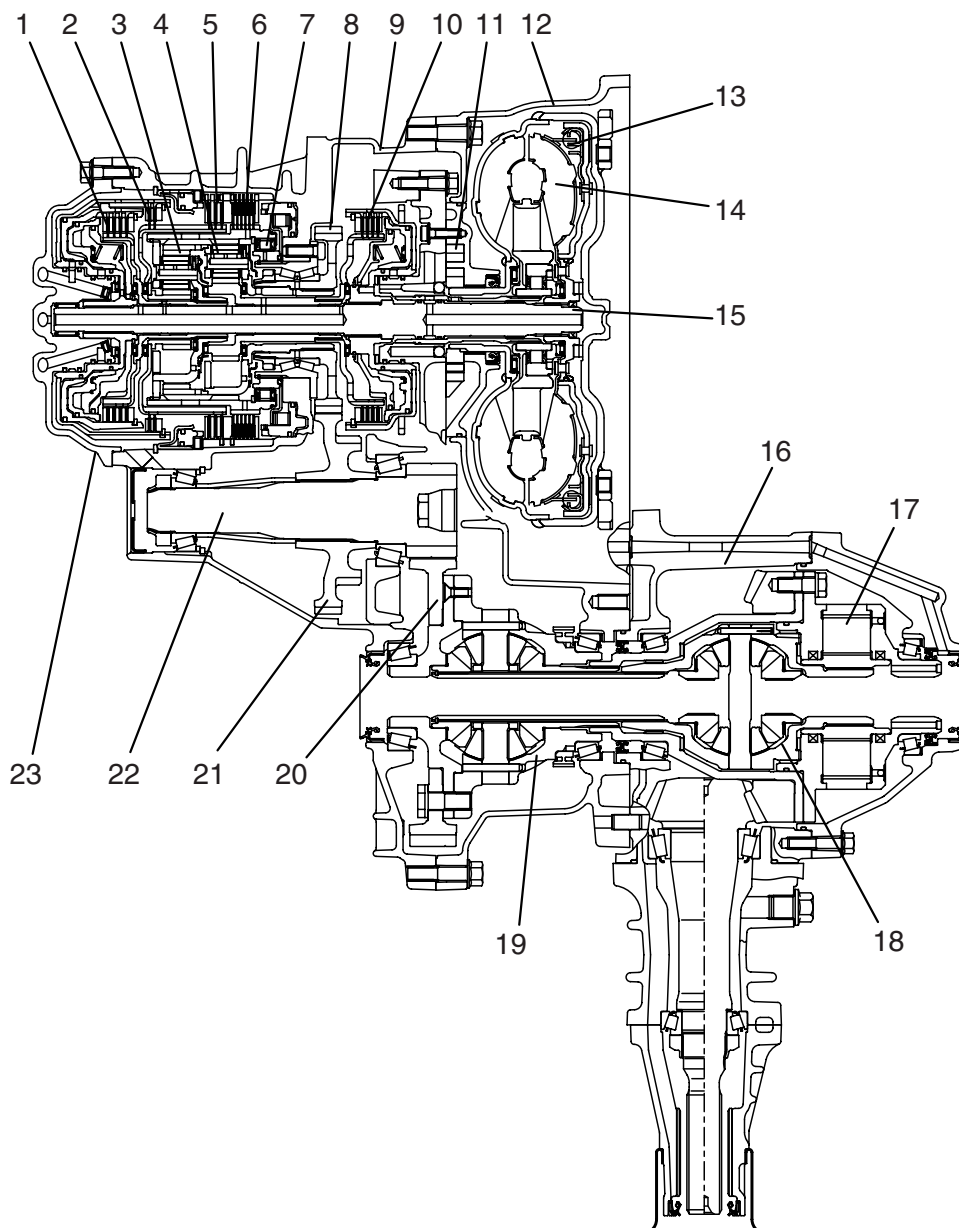
&lt;F4A4B&gt;



AC305544AC

- |                                 |                              |
|---------------------------------|------------------------------|
| 1. Overdrive clutch             | 11. Oil pump                 |
| 2. Reverse clutch               | 12. Torque converter housing |
| 3. Overdrive planetary gear set | 13. Damper clutch            |
| 4. Output planetary gear set    | 14. Torque converter         |
| 5. Second brake                 | 15. Input shaft              |
| 6. Low-reverse brake            | 16. Differential             |
| 7. One-way clutch               | 17. Differential drive gear  |
| 8. Transfer drive gear          | 18. Transfer driven gear     |
| 9. Transmission case            | 19. Output shaft             |
| 10. Underdrive clutch           | 20. Rear cover               |

<W4A4>



AC300112AC

- |                                 |                             |
|---------------------------------|-----------------------------|
| 1. Overdrive clutch             | 13. Damper clutch           |
| 2. Reverse clutch               | 14. Torque converter        |
| 3. Overdrive planetary gear set | 15. Input shaft             |
| 4. Output planetary gear set    | 16. Transfer assembly       |
| 5. Second brake                 | 17. Viscous coupling unit   |
| 6. Low-reverse brake            | 18. Front differential      |
| 7. One-way clutch               | 19. Centre differential     |
| 8. Transfer drive gear          | 20. Differential drive gear |
| 9. Transmission case            | 21. Transfer driven gear    |
| 10. Underdrive clutch           | 22. Output shaft            |
| 11. Oil pump                    | 23. Rear cover              |
| 12. Torque converter housing    |                             |

## ELECTRONIC CONTROL SYSTEM

## EEPROM &lt;4G69&gt;

M2230000300081

Because EEPROM has been used, even if the battery terminals or control unit connectors are disconnected, the necessary learned values are stored in the engine-A/T-ECU to prevent a loss of shift quality. (Initialisation is available by M.U.T.-II/III).

## CONTROL UNIT &lt;4G64&gt;

M2230002000280

The engine-A/T-ECU uses a 119-pin connector. The terminals of this connector are arranged as shown below.

1	2	3	4					5	6		7	8	41	42	43				44	45	46	71	72	73	74				75	76	77	101	102	103	104					105	106	107									
9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		47	48	49	50	51	52	53	54	55	56	57	78	79	80	81	82	83	84	85	86	87	88	89	108	109	110	111	112	113	114	115	116	117	118	119	120
24	25	26	27	28	29	30	31	32	33	34	35		58	59	60	61	62	63	64	65	66	90	91	92	93	94	95	96	97	98		121	122	123	124	125	126	127	128	129	130										

AC401583

- |           |                                    |      |                              |
|-----------|------------------------------------|------|------------------------------|
| 1 to 6.   | Engine use                         | 105. | Shift indicator C            |
| 7.        | A/T fluid temperature warning lamp | 106. | 2nd solenoid valve           |
| 8 to 35.  | Engine use                         | 107. | DCC solenoid valve           |
| 41 to 49. | Engine use                         | 108. | Inhibitor R                  |
| 50.       | A/T control relay                  | 109. | Select switch                |
| 51 to 58. | Engine use                         | 110. | Downshift switch             |
| 59.       | —                                  | 111. | Engine use                   |
| 60 to 66. | Engine use                         | 112. | —                            |
| 71 to 74. | Engine use                         | 113. | Engine use                   |
| 75.       | Auto-cruise signal                 | 114. | —                            |
| 76.       | Earth                              | 115. | —                            |
| 77.       | Solenoid valve power supply        | 116. | —                            |
| 78.       | Throttle position sensor           | 117. | Shift indicator A            |
| 79.       | Engine use                         | 118. | Shift indicator B            |
| 80.       | Vehicle speed signal               | 119. | —                            |
| 81 to 87. | Engine use                         | 120. | UD solenoid valve            |
| 88.       | Earth                              | 121. | Inhibitor switch N           |
| 89.       | Solenoid valve power supply        | 122. | Upshift switch               |
| 90 to 94. | Engine use                         | 123. | Stop lamp switch             |
| 95.       | —                                  | 124. | A/T fluid temperature sensor |
| 96.       | Engine use                         | 125. | —                            |
| 97.       | —                                  | 126. | —                            |
| 98.       | Engine use                         | 127. | —                            |
| 101.      | Inhibitor switch P                 | 128. | —                            |
| 102.      | Inhibitor switch D                 | 129. | LR solenoid valve            |
| 103.      | Input shaft speed sensor           | 130. | OD solenoid valve            |
| 104.      | Output shaft speed sensor          |      |                              |

NOTE: — indicate vacant terminals.

## CONTROL UNIT <4G69>

M2230002000235

The engine-A/T-ECU uses a 140-pin connector. The terminals of this connector are arranged as shown below.

1	2					3	4					31	32					33	34					61	62					63	64					91	92					93	94	95					121	122					123	124		
5	6	7	8	9	10	11	12	13				35	36	37	38	39	40	41	42	43				65	66	67	68	69	70	71	72	73					96	97	98	99	100	101	102	103	104					125	126	127	128	129	130	131	132	133
14	15	16	17	18		19	20					44	45	46	47	48	49		50	51				74	75	76	77	78	79	80	81	82					105	106	107	108	109		110	111	112					134	135	136	137	138	139	140	141	
21	22	23	24	25		26	27					52	53	54	55	56		57	58				83	84	85	86	87		88	89					113	114	115	116	117		118	119	120					142	143	144		145	146					

AC201888

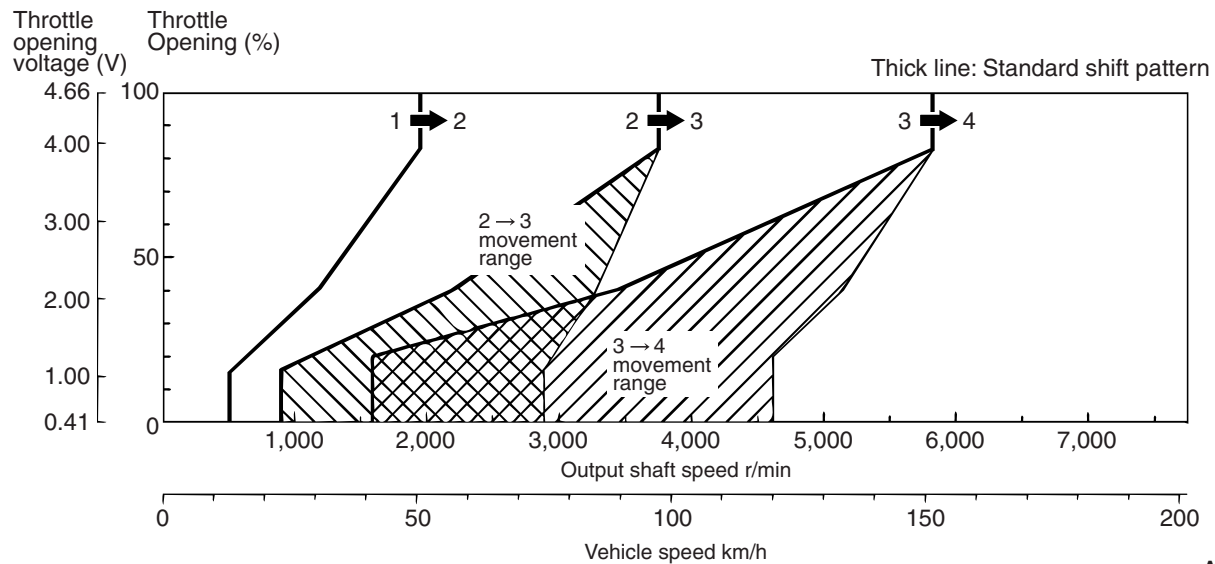
1 to 38.	Engine use	120.	–
39.	Stop lamp switch	121.	Shift indicator C
40 to 63.	Engine use	122.	–
64.	Input shaft speed sensor	123.	Solenoid valve power supply
65.	–	124.	Solenoid valve power supply
66.	Inhibitor switch P	125.	Shift indicator B
67.	Inhibitor switch R	126.	–
68.	Downshift switch	127.	A/T control relay
69 to 72.	Engine use	128.	LR solenoid valve
73.	Output shaft speed sensor	129.	–
74.	Engine use	130.	DCC solenoid valve
75.	Inhibitor switch N	131.	Earth
76.	Inhibitor switch D	132 to	Engine use
77.	Upshift switch	133.	
78.	Engine use	134.	Shift indicator A
79.	Vehicle speed signal	135.	A/T fluid temperature warning lamp <Except for Hong Kong, Brunei, Singapore, Malaysia>
80 to 82.	–	136.	2ND solenoid valve
83.	Engine use	137.	UD solenoid valve
84.	–	138.	OD solenoid valve
85.	Select switch	139 to	Engine use
86 to 118.	Engine use	146.	
119.	A/T fluid temperature sensor		

## SHIFT PATTERN CONTROL

M2230003000346

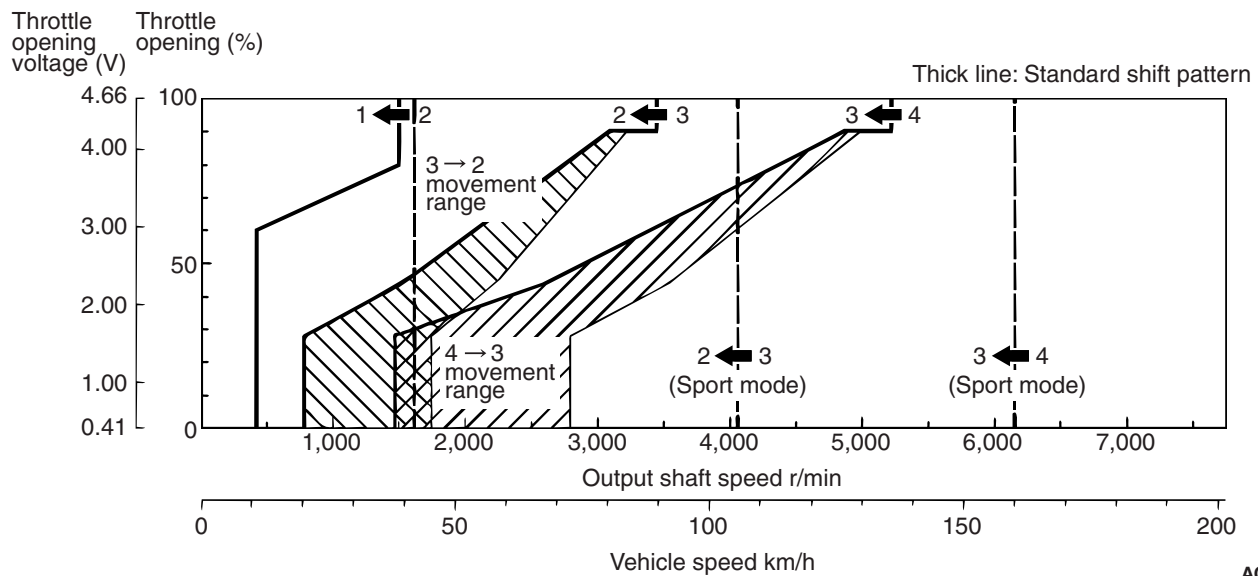
&lt;4G64&gt;

## UPSHIFT PATTERN



AC212047AD

## DOWNSHIFT PATTERN

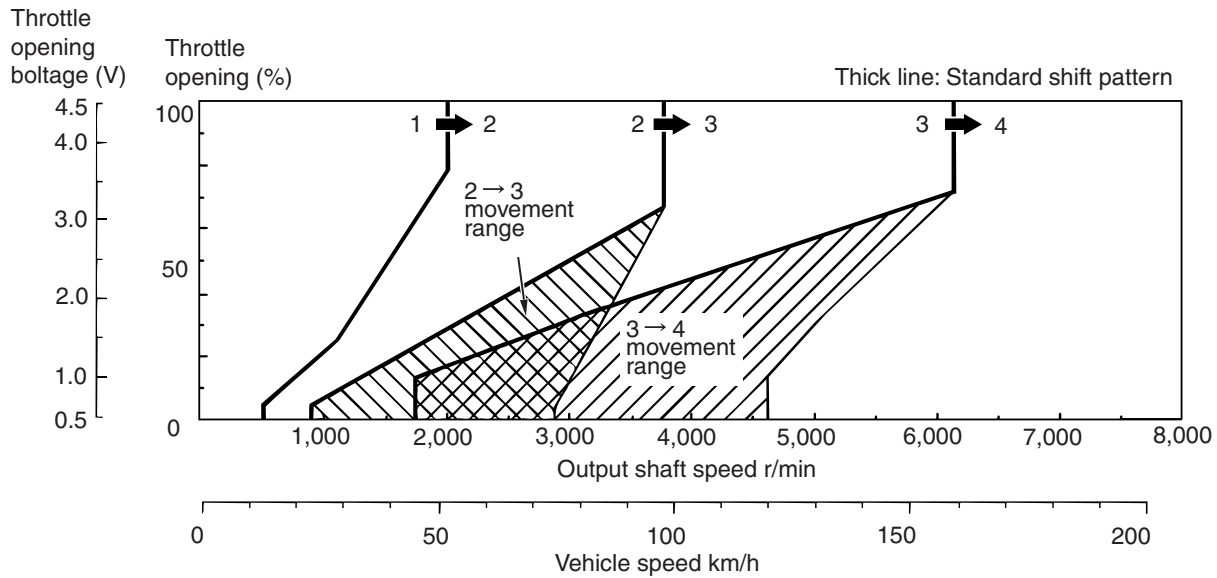


AC212048AC



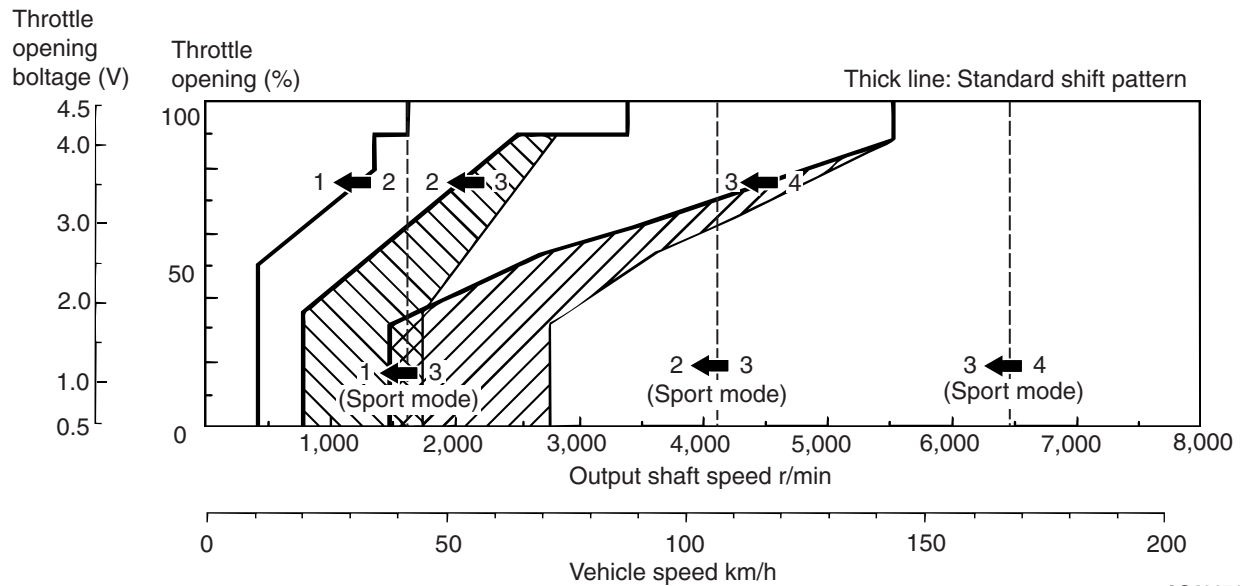
**<EXCEPT FOR AUSTRALLIA, SOUTH  
AFRICA,NEW ZEALAND-4G69.>**

## UPSHIFT PATTERN



AC401740 AC

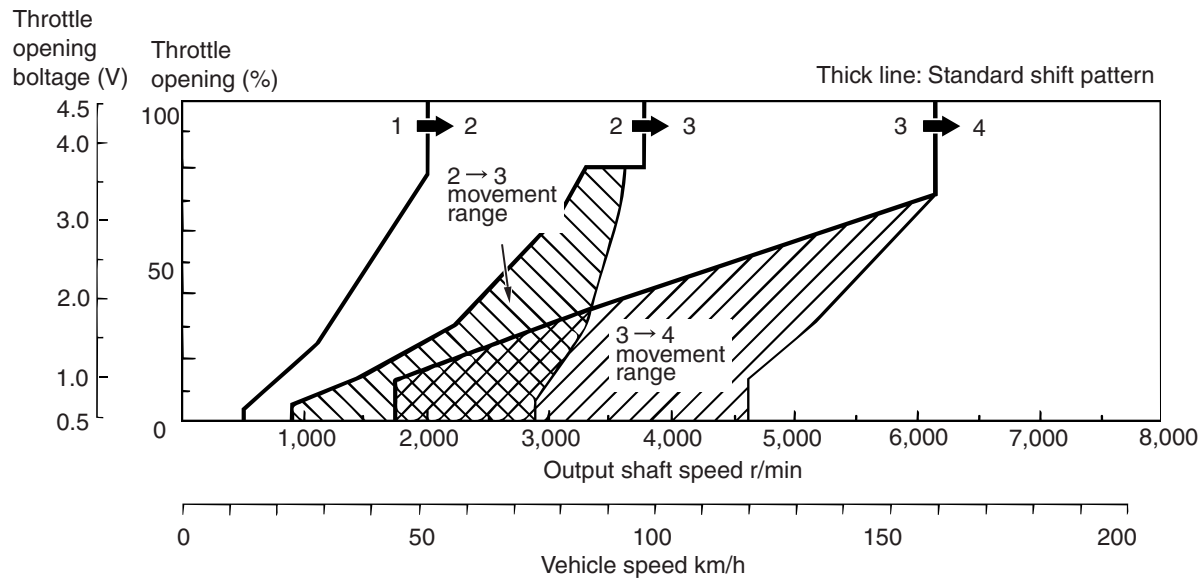
## DOWNSHIFT PATTERN



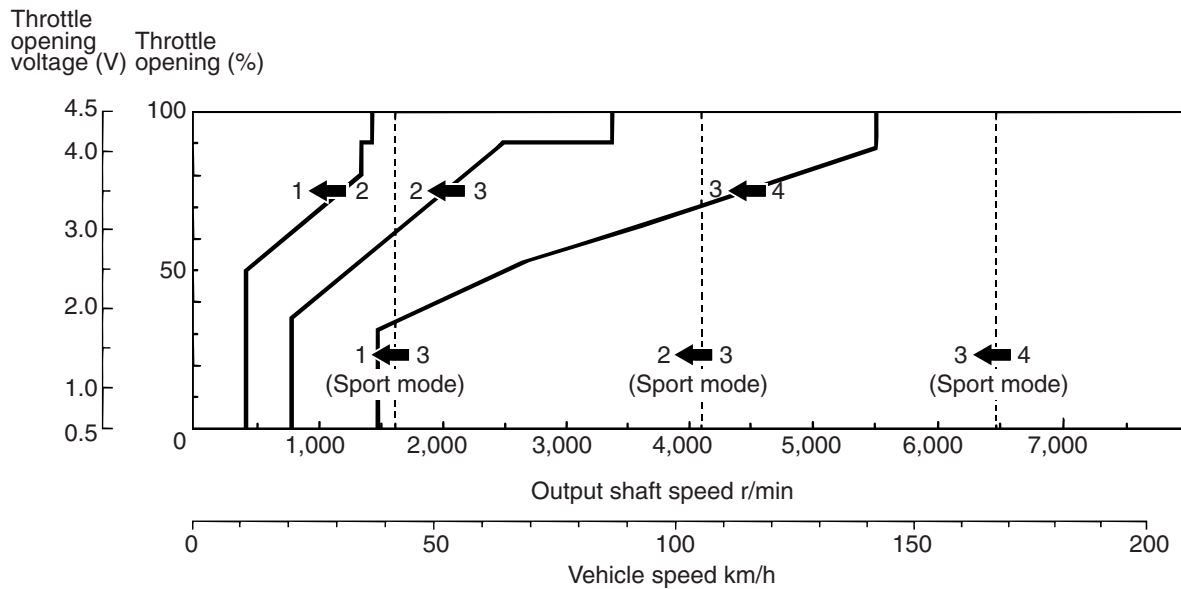
AC401741 AC

<VEHICLES FOR SOUTH AFRICA, AUS-  
TRALLIA AND NEW ZEALAND-4G69>

## UPSHIFT PATTERN

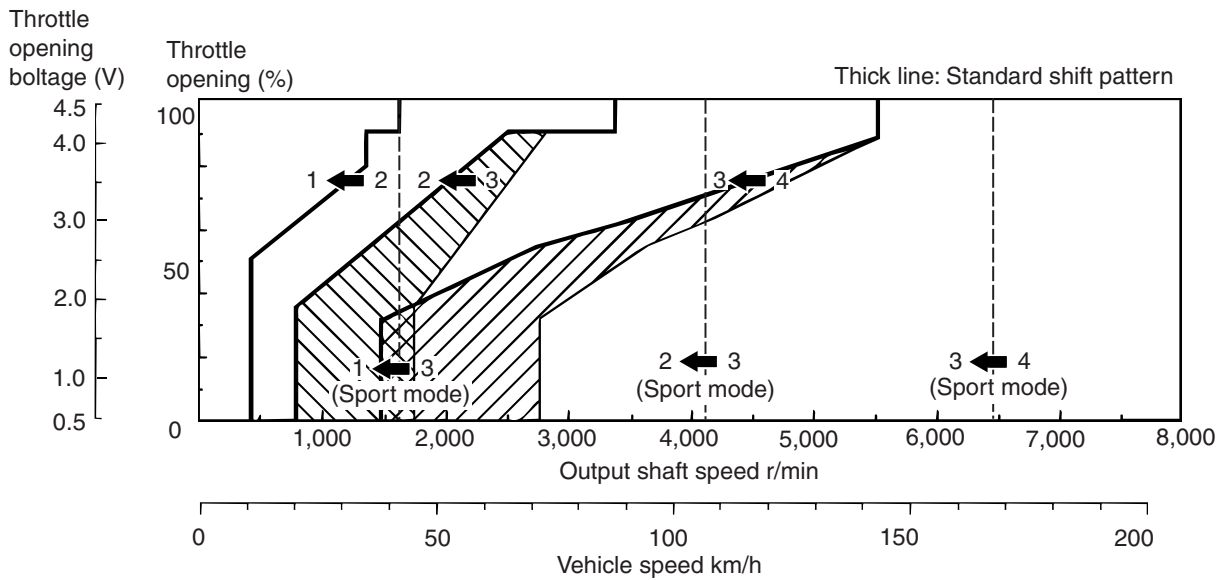


AC401739 AC

DOWNSHIFT PATTERN-AUSTRALIA AND  
NEW ZEALAND-4G69

AC401733 AB

## DOWNSHIFT PATTERN-SOUTH AFRICA



AC401742 AC

## DIAGNOSIS CLASSIFICATION TABLE

<4G64>

M2230010000241

Item		Diagnosis code No.	Data list		Actuator test
			Item No.	Display	
Throttle position sensor (TPS)	Short circuit	11	11	mV	—
	Open circuit	12			—
	Sensor maladjustment	14			—
A/T fluid temperature sensor	Open circuit	15	15	°C	—
Crank angle sensor	Open circuit	21	21	r/min	—
Input shaft speed sensor	Short circuit/open circuit	22	22	r/min	—
Output shaft speed sensor	Short circuit/open circuit	23	23	r/min	—
Stop lamp switch	Short circuit	26	26	ON/OFF	—
Vehicle speed signal		—	29	km/h	—
LR solenoid valve	Short circuit/open circuit	31	31	%	01
UD solenoid valve	Short circuit/open circuit	32	32	%	02
2ND solenoid valve	Short circuit/open circuit	33	33	%	03
OD solenoid valve	Short circuit/open circuit	34	34	%	04
DCC solenoid valve	Short circuit/open circuit	36	36	%	06
Gear shift incomplete	1st	41	—	—	—
	2nd	42	—	—	—
	3rd	43	—	—	—
	4th	44	—	—	—
	Reverse	46	—	—	—
Damper clutch system	System defect	52	52	r/min	—

Item		Diagnosis code No.	Data list		Actuator test
			Item No.	Display	
A/T control relay	Earth short circuit/open circuit	54	54	V	12
"N" range lamp	Open circuit	56	—	—	—
Engine volumetric efficiency		—	57	%	—
Inhibitor switch		—	61	P, R, N, D	—
Shift position		—	63	4th, 3rd, 2nd, 1st, REV, NP	—
A/C-ECU		—	65	ON/OFF	—
Auto-cruise engaged signal		—	66	ON/OFF	—
Select switch		—	67	ON/OFF	—
Shift switch (Up)		—	68	ON/OFF	—
Shift switch (Down)		—	69	ON/OFF	—
Shift indicator	1st	—	—	—	07
	2nd	—	—	—	08
	3rd	—	—	—	09
	4th	—	—	—	10
INVECS-II cancel command		—	—	—	14

## DIAGNOSIS CLASSIFICATION TABLE

&lt;4G69&gt;

M2230010000252

Item		Diagnosis code No.	Data list		Actuator test
			Item No.	Display	
Throttle position sensor (TPS)		—	11	mV	—
A/T fluid temperature sensor	Open circuit	15	15	°C	—
	Short circuit	16			
Crank angle sensor	Open circuit	21	21	r/min	—
Input shaft speed sensor	Short circuit/open circuit	22	22	r/min	—
Output shaft speed sensor	Short circuit/open circuit	23	23	r/min	—
Stop lamp switch	Short circuit	26	26	ON/OFF	—
Inhibitor switch	Open circuit	27	61	P, R, N, D	—
	Short circuit	28			—
Vehicle speed signal		—	29	km/h	—
LR solenoid valve	Short circuit/open circuit	31	31	%	01
UD solenoid valve	Short circuit/open circuit	32	32	%	02
2ND solenoid valve	Short circuit/open circuit	33	33	%	03
OD solenoid valve	Short circuit/open circuit	34	34	%	04
DCC solenoid valve	Short circuit/open circuit	36	36	%	06

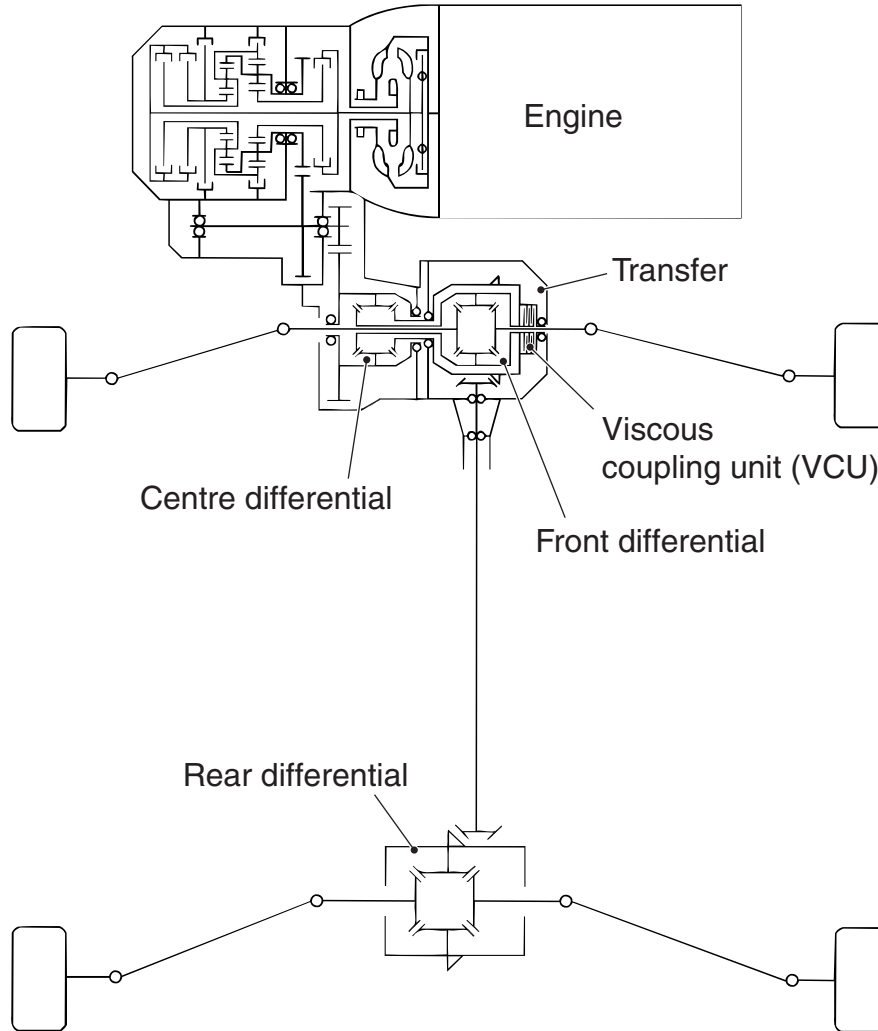
Item		Diagnosis code No.	Data list		Actuator test
			Item No.	Display	
Gear shift incomplete	1st	41	—	—	—
	2nd	42	—	—	—
	3rd	43	—	—	—
	4th	44	—	—	—
	Reverse	46	—	—	—
INVECS-II cancel command		—	40	ON/OFF	14
Damper clutch system	System defect	52	52	r/min	—
A/T control relay	Earth short circuit/open circuit	54	54	V	12
"N" range lamp	Open circuit	56	—	—	—
Engine volumetric efficiency		—	57	%	—
Shift position		—	63	4th, 3rd, 2nd, 1st, REV, NP	—
A/C-ECU		—	65	ON/OFF	—
Auto-cruise engaged signal		—	66	ON/OFF	—
Select switch		—	67	ON/OFF	—
Shift switch (Up)		—	68	ON/OFF	—
Shift switch (Down)		—	69	ON/OFF	—
Shift indicator	1st	—	—	—	07
	2nd	—	—	—	08
	3rd	—	—	—	09
	4th	—	—	—	10

## 4WD SYSTEM

## GENERAL INFORMATION

M2230000100225

- The 4WD system uses the centre differential with limited slip device.
- A viscous coupling unit (VCU) is used for the centre differential limited slip device, and is located in the rear of the front differential.



AC107112AB

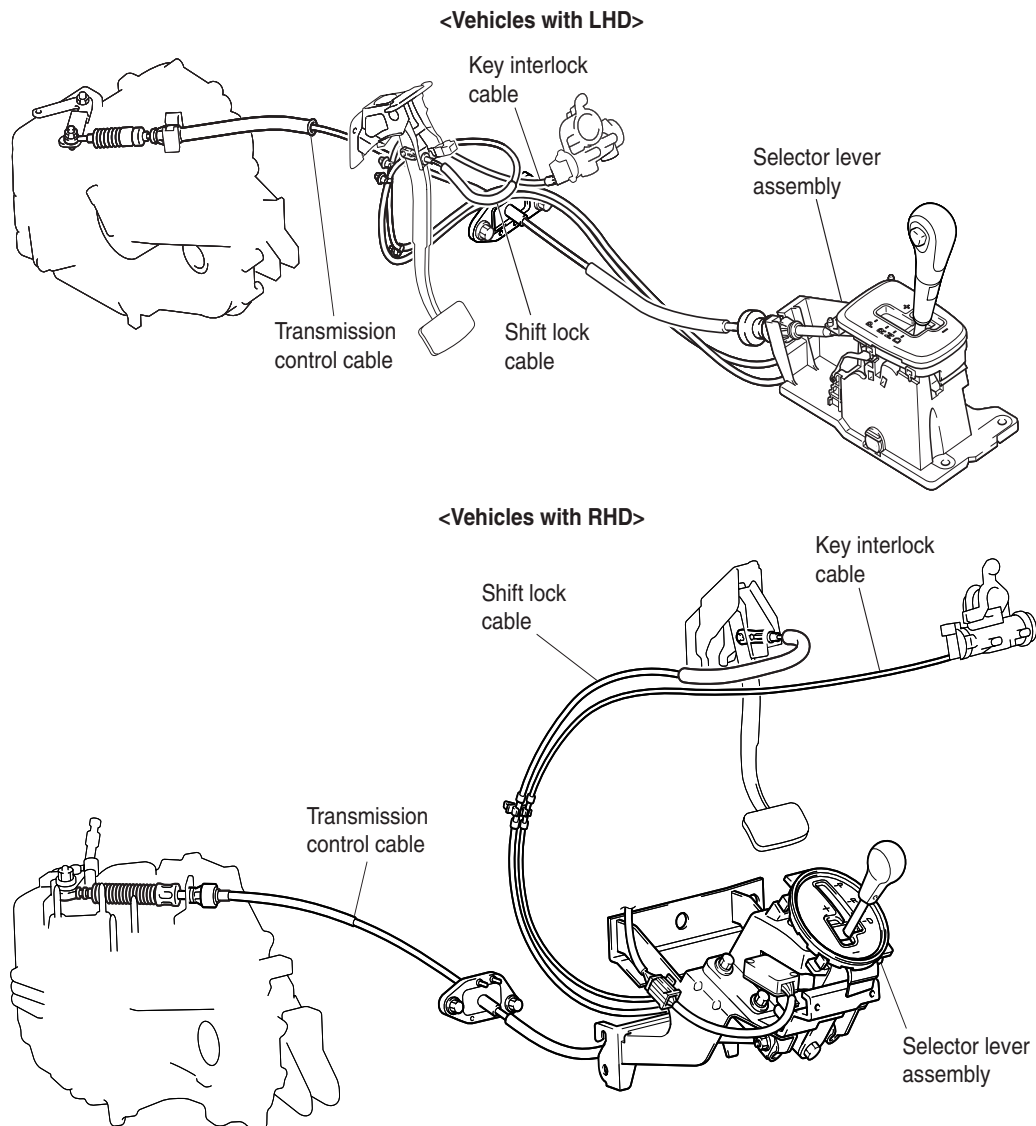
## TRANSMISSION CONTROL

### GENERAL INFORMATION

M2232000100384

- For LHD vehicles, the selector lever assembly is installed on the floor console, and for RHD vehicles, it is installed on the instrument panel. In addition, for RHD vehicles, the selector lever assembly is equipped with the energy absorbing mechanism which absorbs impact energy at collision.
- The selector lever assembly has two gates; main gate and manual gate. Main gate has four shift positions (P, R, N, D), which allows the same control as the conventional A/T. The manual gate allows the driver to select gears just like a manual transmission.
- In order to prevent a sudden start caused by misguided lever operation, the system uses A/T prevention misguided operation mechanisms (consisting of shift lock mechanism and key interlock mechanism). <4G69 (Vehicles with shift lock cable)>

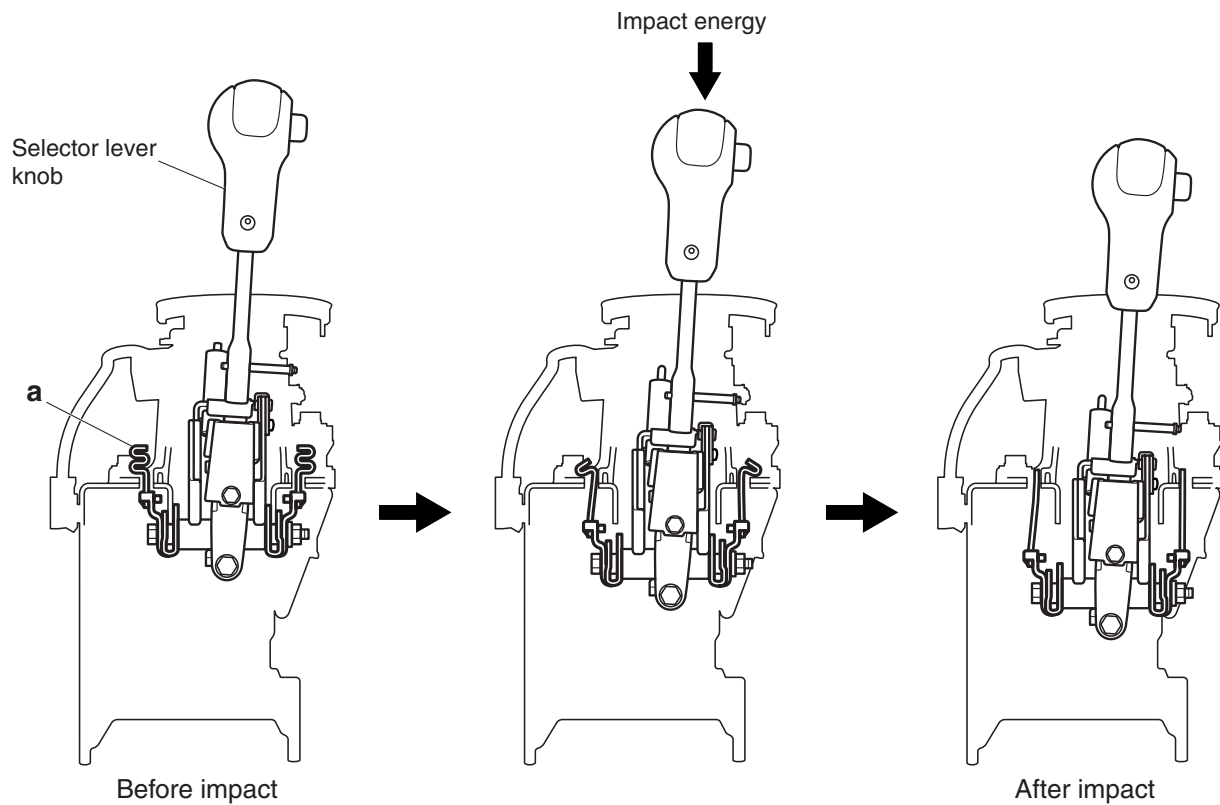
### COMPONENT VIEW



AC300003AB

**ENERGY ABSORBING MECHANISM****<RHD VEHICLES>**

When impact energy is applied to the selector lever knob, the part "a" in the figure is stretched, and the selector lever is retracted to absorb the impact.





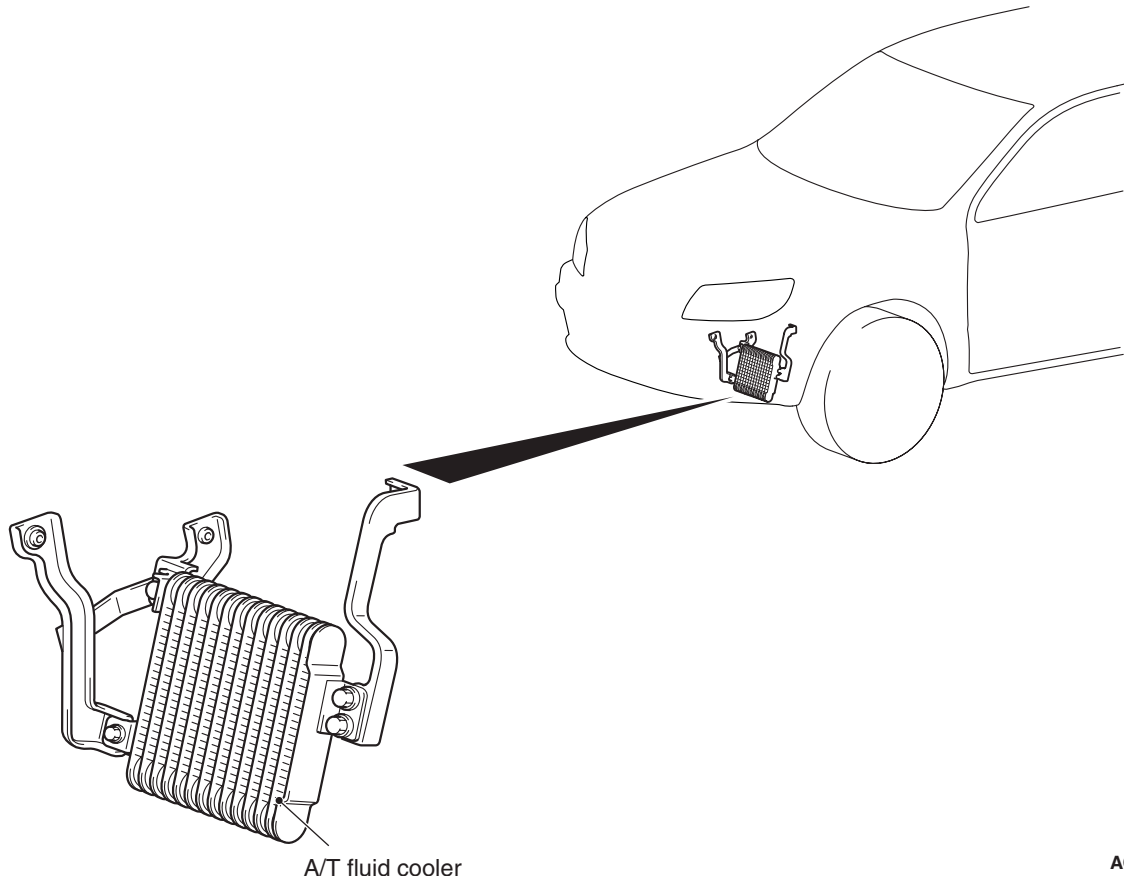
## A/T FLUID COOLER

### GENERAL INFORMATION

M2233001000145

The conventional water-cooled (integrated in the radiator) A/T fluid cooler is adopted. The air-cooled A/T fluid cooler is added to increase the cooling capacity.

### CONSTRUCTION DIAGRAM



AC502565AB

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## NOTES